Cancer Control
Knowledge into Action
WHO Guide for Effective Programmes

Diagnosis and Treatment

World Health Organization

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Introduction to the
Cancer Control Series

Cancer is to a large extent avoidable. Many cancers can be prevented. Others can be detected early in their development, treated and cured. Even with late stage cancer, the pain can be reduced, the progression of the cancer slowed, and patients and their families helped to cope.

Cancer is a leading cause of death globally. The World Health Organization estimates that 7.6 million people died of cancer in 2005 and 84 million people will die in the next 10 years if action is not taken. More than 70% of all cancer deaths occur in low- and middle-income countries, where resources available for prevention, diagnosis and treatment of cancer are limited or nonexistent.

But because of the wealth of available knowledge, all countries can, at some useful level, implement the four basic components of cancer control – *prevention, early detection, diagnosis and treatment, and palliative care* – and thus avoid and cure many cancers, as well as palliating the suffering.

Cancer control: knowledge into action, WHO guide for effective programmes is a series of six modules that provides practical advice for programme managers and policy-makers on how to advocate, plan and implement effective cancer control programmes, particularly in low- and middle-income countries.
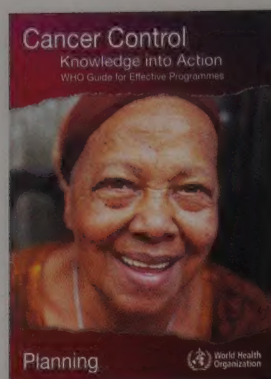
PLANNING
A practical guide for programme managers on how to plan overall cancer control effectively, according to available resources and integrating cancer control with programmes for other chronic diseases and related problems.
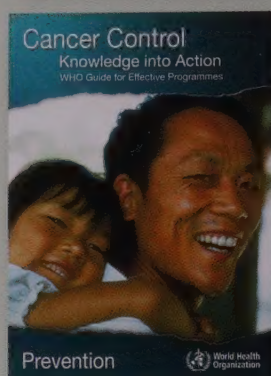
PREVENTION
A practical guide for programme managers on how to implement effective cancer prevention by controlling major avoidable cancer risk factors.
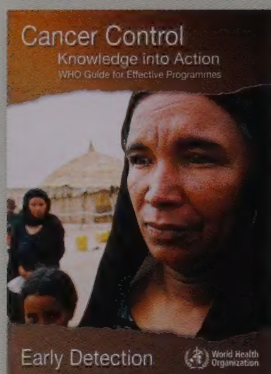
EARLY DETECTION
A practical guide for programme managers on how to implement effective early detection of major types of cancer that are amenable to early diagnosis and screening.
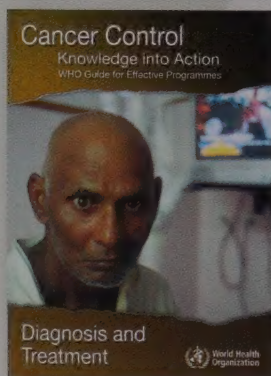
DIAGNOSIS AND TREATMENT
A practical guide for programme managers on how to implement effective cancer diagnosis and treatment, particularly linked to early detection programmes or curable cancers.
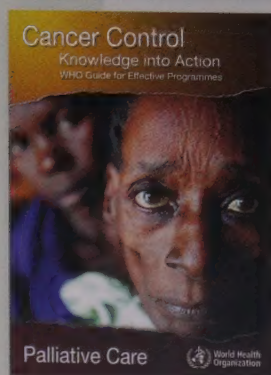
PALLIATIVE CARE
A practical guide for programme managers on how to implement effective palliative care for cancer, with a particular focus on community-based care.
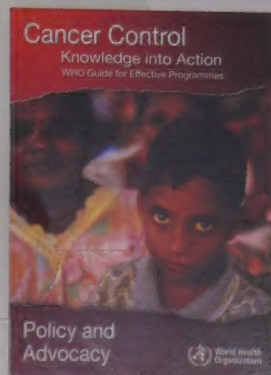
POLICY AND ADVOCACY
A practical guide for medium level decision-makers and programme managers on how to advocate for policy development and effective programme implementation for cancer control.

The WHO guide is a response to the World Health Assembly resolution on cancer prevention and control (WHA58.22), adopted in May 2005, which calls on Member States to intensify action against cancer by developing and reinforcing cancer control programmes. It builds on *National cancer control programmes: policies and managerial guidelines* and *Preventing chronic diseases: a vital investment*, as well as on the various WHO policies that have influenced efforts to control cancer.

Cancer control aims to reduce the incidence, morbidity and mortality of cancer and to improve the quality of life of cancer patients in a defined population, through the systematic implementation of evidence-based interventions for prevention, early detection, diagnosis, treatment, and palliative care. Comprehensive cancer control addresses the whole population, while seeking to respond to the needs of the different subgroups at risk.

COMPONENTS OF CANCER CONTROL

Prevention of cancer, especially when integrated with the prevention of chronic diseases and other related problems (such as reproductive health, hepatitis B immunization, HIV/AIDS, occupational and environmental health), offers the greatest public health potential and the most cost-effective long-term method of cancer control. We now have sufficient knowledge to prevent around 40% of all cancers. Most cancers are linked to tobacco use, unhealthy diet, or infectious agents (see Prevention module).

Early detection detects (or diagnoses) the disease at an early stage, when it has a high potential for cure (e.g. cervical or breast cancer). Interventions are available which permit the early detection and effective treatment of around one third of cases (see Early Detection module).

There are two strategies for early detection:
- *early diagnosis*, often involving the patient's awareness of early signs and symptoms, leading to a consultation with a health provider – who then promptly refers the patient for confirmation of diagnosis and treatment;

- *national or regional screening* of asymptomatic and apparently healthy individuals to detect pre-cancerous lesions or an early stage of cancer, and to arrange referral for diagnosis and treatment.

Treatment aims to cure disease, prolong life, and improve the quality of remaining life after the diagnosis of cancer is confirmed by the appropriate available procedures. The most effective and efficient treatment is linked to early detection programmes and follows evidence-based standards of care. Patients can benefit either by cure or by prolonged life, in cases of cancers that although disseminated are highly responsive to treatment, including acute leukaemia and lymphoma. This component also addresses rehabilitation aimed at improving the quality of life of patients with impairments due to cancer (see Diagnosis and Treatment module).

Palliative care meets the needs of all patients requiring relief from symptoms, and the needs of patients and their families for psychosocial and supportive care. This is particularly true when patients are in advanced stages and have a very low chance of being cured, or when they are facing the terminal phase of the disease. Because of the emotional, spiritual, social and economic consequences of cancer and its management, palliative care services addressing the needs of patients and their families, from the time of diagnosis, can improve quality of life and the ability to cope effectively (see Palliative Care module).

Despite cancer being a global public health problem, many governments have not yet included cancer control in their health agendas. There are competing health problems, and interventions may be chosen in response to the demands of interest groups, rather than in response to population needs or on the basis of cost-effectiveness and affordability.

Low-income and disadvantaged groups are generally more exposed to avoidable cancer risk factors, such as environmental carcinogens, tobacco use, alcohol abuse and infectious agents. These groups have less political influence, less access to health services, and lack education that can empower them to make decisions to protect and improve their own health.

BASIC PRINCIPLES OF CANCER CONTROL

- **Leadership** to create clarity and unity of purpose, and to encourage team building, broad participation, ownership of the process, continuous learning and mutual recognition of efforts made.

- **Involvement of stakeholders** of all related sectors, and at all levels of the decision-making process, to enable active participation and commitment of key players for the benefit of the programme.

- **Creation of partnerships** to enhance effectiveness through mutually beneficial relationships, and build upon trust and complementary capacities of partners from different disciplines and sectors.

- **Responding to the needs of people** at risk of developing cancer or already presenting with the disease, in order to meet their physical, psychosocial and spiritual needs across the full continuum of care.

- **Decision-making** based on evidence, social values and efficient and cost-effective use of resources that benefit the target population in a sustainable and equitable way.

- **Application of a systemic approach** by implementing a comprehensive programme with interrelated key components sharing the same goals and integrated with other related programmes and to the health system.

- **Seeking continuous improvement,** innovation and creativity to maximize performance and to address social and cultural diversity, as well as the needs and challenges presented by a changing environment.

- **Adoption of a stepwise approach** to planning and implementing interventions, based on local considerations and needs (see next page for WHO stepwise framework for chronic diseases prevention and control, as applied to cancer control).

WHO stepwise framework

1 PLANNING STEP 1
Where are we now?

Investigate the present state of the cancer problem, and cancer control services or programmes.

2 PLANNING STEP 2
Where do we want to be?

Formulate and adopt policy. This includes defining the target population, setting goals and objectives, and deciding on priority interventions across the cancer continuum.

3 PLANNING STEP 3
How do we get there?

Identify the steps needed to implement the policy.

The planning phase is followed by the policy implementation phase.

Implementation step 1
CORE

Implement interventions in the policy that are feasible now, with existing resources.

Implementation step 2
EXPANDED

Implement interventions in the policy that are feasible in the medium term, with a realistically projected increase in, or reallocation of, resources.

Implementation step 3
DESIRABLE

Implement interventions in the policy that are beyond the reach of current resources, if and when such resources become available.

DIAGNOSIS AND TREATMENT MODULE CONTENTS

KEY MESSAGES

The first module in the Cancer Control series, *Planning*, provides a template for cancer control planning and progamme implementation. The recommended framework draws on earlier WHO work in this field, the principles of which are set out in *National cancer control programmes, policies and managerial guidelines* (WHO, 2002), and various WHO policies that have influenced cancer control in the recent past.

This module discusses how to plan and implement an effective diagnosis and treatment programme using a public health approach, within the context of a national cancer control programme. It will be updated within the next 5 years as it is intended to evolve in response to new knowledge, evidence-based information, national needs and experience.

The key messages for people involved in planning cancer diagnosis and treatment services are as follows:

◘ The main goals of a diagnosis and treatment programme are to cure or considerably prolong the life of cancer patients and to ensure the best possible quality of life to cancer survivors.

◘ Diagnosis and treatment services should initially target all patients presenting with curable tumours. If more resources are available, the programme should be extended to include patients with the common cancers that are treatable but not curable.

◘ Effective diagnostic and treatment services use a multidisciplinary approach and are integrated into the existing health system. Services are usually best developed at the secondary and tertiary levels as they are often costly, requiring specialized staff, infrastructure and procedures.

◘ Treatment involves not only managing all aspects of the cancer itself, but also the psychosocial and rehabilitation needs of the patients and their families. Psychosocial support is particularly important because, in many countries, cancer is greatly feared and stigmatized.

◘ Although the basic principles of cancer treatment are the same throughout the world, the specific treatment approaches adopted in each country should take into account cost-effectiveness, affordability, and social and ethical aspects. Services should, however, always be provided in an equitable and sustainable manner.

◘ Health professionals caring for cancer patients need to be prepared to decide, in consultation with the patient, when therapeutic measures to cure or prolong life are no longer likely to be beneficial to the patient and to institute palliative care instead (see *Palliative care* module).

key definitions

Cancer diagnosis comprises the various techniques and procedures used to detect or confirm the presence of cancer. Diagnosis typically involves evaluation of the patient's history, clinical examinations, review of laboratory test results and radiological data, and microscopic examination of tissue samples obtained by biopsy or fine-needle aspiration.

Cancer staging is the grouping of cases into broad categories based on the extent of disease, that is, how far the cancer has spread from the organ or site of origin (the primary site). Knowing the extent of disease (or stage) helps the physician determine the most appropriate treatment to either effect a cure, decrease the tumour burden, or relieve symptoms. "Early cancer" refers to stages I and II. "Advanced cancer" refers to stages III and IV. Stage of disease at diagnosis is generally the most important factor determining the survival of cancer patients. The duration of survival is widely used as a measure of the effectiveness of the treatment of cancer.

Cancer treatment is the series of interventions, including psychosocial support, surgery, radiotherapy, chemotherapy and hormone therapy, that is aimed at curing the disease or prolonging the patient's life considerably (for several years) while improving the patient's quality of life.

Cancer management involves cancer staging and treatment. Cancer management starts from the moment the patient's diagnosis of cancer is confirmed.

Cancer survivors are those patients who having had cancer are, following treatment, now cured of the disease. Cure is defined as the attainment of normal life expectancy and has three important components:
- recovery from all evidence of disease (complete remission);
- attainment of a stage of minimal or no risk of recurrence or relapse;
- restoration of functional health (physical, developmental and psychosocial).

Curable cancers are cancers for which treatment can give patients a high potential for being disease free in the 10 years following cessation of treatment, such that the patient may eventually die of another condition. Curable cancers include:
- cancers that can be detected early and effectively treated;
- cancers that although disseminated or not amenable to early detection methods, have a high potential for being cured with appropriate treatment.

Cancers that are treatable but not curable are cancers for which treatment can prolong life considerably (for several years) by temporarily stopping or slowing down the progression of the disease.

PRE-PLANNING

It is estimated that, worldwide, there are millions of cancer patients with curable cancers. With early detection, timely diagnosis and adequate treatment, carried out within the context of a comprehensive cancer control plan, the lives of a significant number of cancer patients can be saved or prolonged considerably.

IS A NEW CANCER DIAGNOSIS AND TREATMENT PLAN NEEDED?

There is no country in the world where cancer does not occur. Curative treatment exists for about one third of all cancer cases, but particularly breast, cervical and oral cancers, provided they are detected early. Some cancers, such as metastatic seminoma, and acute leukaemia and lymphomas in children, although disseminated or not amenable to early detection methods, have high potential for being cured. Patients suffering from these types of cancers can be diagnosed and treated with interventions that are affordable, even in low-income countries.

Unfortunately, in many countries, particularly low-income countries, diagnostic and treatment services are not planned rationally. Treatment technologies and infrastructure are not linked to early detection strategies, and there is usually an excessive reliance on costly procedures that serve mainly the wealthy who can afford them. Consequently, a high proportion of patients having cancers that are curable if detected early are diagnosed in advanced stages, at which point a small number receive costly, but ineffective and incomplete treatment. In such settings, the same resources would be better employed, and would benefit a greater number of patients, if they were to be used to fund low-cost palliative care (see *Early detection* and *Palliative care* modules).

The development of good quality diagnostic and treatment services to address curable cancers is therefore imperative, especially in the great majority of low-income countries. This would help to save lives, avoid unnecessary suffering and make more efficient use of limited resources.

her story

DIAGNOSED WITH ACUTE LYMPHOBLASTIC LEUKAEMIA AT THE AGE OF 12 YEARS, LALITA IS NOW DISEASE FREE AND LOOKS TO THE FUTURE WITH OPTIMISM AND HOPE

Eulalia Maria Vásquez Rivera (Lalita) is originally from Tegucigalpa, Honduras, and is the fourth daughter in a low-income family. She has six brothers and sisters.

Lalita was experiencing bone pain, permanent fever, weight loss and bleeding gums. She remembers what happened during hurricane Mitch, when her parents took her to Escuela Hospital, the main teaching hospital in the public health system. At 12 years of age, in the Paediatric Haemato-oncology Unit, she was diagnosed with acute lymphoblastic leukaemia.

Lalita started chemotherapy treatment in November 2001 and successfully completed it at the end of August 2004. She has been free of the disease for 3 years. She is now 17 years old and very happy. One of her dreams used to be to become an interior decorator, but now she would like to become a nurse.

Lalita says, "Suffering from cancer has taught me to enjoy life immensely. Whatever I undertake, I will achieve through faith in God and in myself."

Lalita is but one of the 500 children who have been diagnosed and treated for acute lymphoblastic leukaemia in the past 7 years at the Paediatric Haemato-oncology Unit of the Escuela Hospital. The Unit is open to all children who suffer from leukaemia or other types of cancer. For patients from low-income families, the cost of treatment is covered by the public health system, with the assistance of the Honduran Foundation for Children with Cancer. Assistance from the latter is generally in the form of provision of chemotherapy drugs, special laboratory tests, and psychosocial support for patients and their families.

Honduras is a low-income country facing numerous economic and social challenges. However, thanks to a well-organized programme for the treatment of childhood cancer, great progress has been made. Today, around 60% of children with acute lymphoblastic leukaemia can be cured using standardized protocols for treatment and comprehensive care.

PLANNING STEP 1
Where are we now?

The *Planning* module provides an overview of what to assess in relation to the overall cancer needs in the general population, the groups particularly at risk, and the existing plan and services for responding to those needs. This *Diagnosis and treatment* module provides more detailed information on how to assess the number of people in need of diagnosis and treatment, and the existing diagnostic and treatment policies and services.

ASSESS THE NUMBER OF CANCER PATIENTS IN NEED OF DIAGNOSIS AND TREATMENT

By assessing the number of people with curable cancers or cancers that are treatable but not curable, it is possible to estimate the number of patients who could benefit most from timely and adequate diagnostic and treatment services.

Performing such an assessment will provide responses to the following key questions:

- Which are the most common cancer types that have high potential for being detected early and cured?
- Which are the most frequent cancer types that, although disseminated or not amenable to early detection, have a high potential for being cured?
- Which are the most frequent cancer types that are treatable but not curable?
- What proportion of all paediatric cancers are curable?
- What proportion of all paediatric cancers are treatable but not curable?
- What proportion of all adult cancers are curable?
- What proportion of all adult cancers are treatable but not curable?

For each common cancer type with a high potential for cure or for which treatment may prolong the patient's life considerably (for several years), it is important to determine the age, sex and geographical disparities in incidence, stage distribution, mortality and survival.

Table 1 provides a template for organizing the data obtained by the disease burden assessment and thereby identifying the most common types of curable cancers and cancers that are treatable but not curable. The necessary data can be derived according to the approaches described in the *Planning* module (see planning step 1, pages 14–15).

Table 1. The burden of curable cancers and cancers that are treatable but not curable: what to assess

Cancer type/site	Incidence	Stage at diagnosis	Survival	Mortality	Disparities
Cancers that are curable when detected early					
Breast					
Cervix					
Colon and rectum					
Oral cavity					
Nasopharynx					
Larynx					
Stomach					
Skin melanoma					
Other skin cancers					
Urinary bladder					
Prostate					
Retinoblastoma[a]					
Testis					
Cancers that are disseminated or not amenable to early detection but potentially curable					
Metastatic seminoma					
Acute lymphatic leukaemia[a]					
Hodgkin lymphoma[a]					
Non-Hodgkin lymphoma[a]					
Osteosarcoma[a]					
All curable cancers					
Cancers that are treatable but not curable					
Advanced breast cancer					
Advanced cutaneous melanoma					
Advanced Hodgkin lymphoma					
Advanced non-Hodgkin lymphoma					

[a] High cure rates in children

ASSESS THE EXISTING DIAGNOSIS AND TREATMENT PLAN AND ONGOING ACTIVITIES

In assessing the existing diagnosis and treatment plan and ongoing activities, it is important to recognize that diagnosis and treatment together constitute a complex component of overall cancer control which, in an ideal scenario at least, is closely allied to early detection and palliative care activities. Cancer diagnosis and treatment services are mainly available at the secondary and tertiary levels, and are usually provided by professionals from a great variety of disciplines and specialties.

Table 2 shows what to assess regarding the existing cancer diagnosis and treatment plan and ongoing activities. These aspects are discussed in more detail in the *Planning* module. The initial focus should be on the gap between what is needed to provide services to the population with curable cancers, and what is currently available.

Table 2. The diagnosis and treatment plan and related activities: what to assess

Plan and activities	What to assess
Diagnosis and treatment plan	○ Endorsement of the plan and its scope (geographical area and cancer types included) ○ Whether or not part of a comprehensive cancer control plan ○ Timeliness (updated/outdated) ○ Accessibility to the written plan ○ Stakeholders' involvement in plan development ○ Inclusion of critical sections of the plan (assessments, goals and objectives, strategies, timetable, responsible persons, resources, monitoring and evaluation) ○ Priorities (objectives and actions related to diagnosis and treatment of curable cancers) ○ Integration with the plan for noncommunicable diseases and other related problems ○ Utility of the plan (used to guide programme implementation)
Ongoing diagnosis and treatment services	○ Number and coverage of diagnosis and treatment interventions and related services offered (including patient education, psychosocial support, symptom management, home care, etc.) ○ Quality of ongoing diagnosis and treatment activities ○ Integration with ongoing services for noncommunicable diseases and other related problems ○ Evaluation of outcomes, output and process indicators, and trends
Resources of ongoing diagnosis and treatment services	○ Information systems (cancer registries, surveillance of diagnosis and treatment interventions) ○ Protocols, guidelines, manuals, educational materials, etc. ○ Physical resources (infrastructure, technologies, essential list of chemotherapy drugs) ○ Human resources (leaders, councils, committees, health-care networks, health-care providers, partners, traditional healers) ○ Financial resources ○ Regulations and legislation
Context of the diagnosis and treatment plan and activities	○ SWOT analysis: strengths, weaknesses, opportunities and threats concerning the performance of the cancer diagnosis and treatment programme

Ask the following questions to assess the existing diagnosis and treatment service provision:

WHAT DIAGNOSIS AND TREATMENT SERVICES ARE AVAILABLE?
- Are there diagnosis and treatment services for curable tumours? How are they organized?
- Are the diagnosis and treatment services linked to early detection programmes?
- Are the diagnosis and treatment services linked to palliative care?
- What is the target population for the diagnosis and treatment programme? Does it explicitly include adults and children?
- What diagnostic tests are recommended to confirm the diagnosis of specific types of curable cancers and of other common cancers that are treatable but not curable?
- Are there clinical guidelines for the treatment of the curable cancers?
- Are there clinical guidelines for the treatment of the cancers that are treatable but not curable?
- Are there guidelines for the provision of patient information and support?
- Are there guidelines for organizing treatment services for curable tumours?
- Are there guidelines for organizing treatment services for the cancers that are treatable but not curable?
- Do the organizational guidelines define the roles and functions of health-care providers at the different levels of care?
- Are there systems to ensure regular monitoring and evaluation?
- Do the monitoring and evaluation systems include adequate quality control of the diagnostic, treatment and follow-up methods?

HOW WELL ARE DIAGNOSIS AND TREATMENT PROGRAMMES DOING? HAVE MEASURES OF SERVICE DELIVERY QUALITY BEEN IDENTIFIED AND ARE THEY MONITORED REGULARLY?

Quality can either be assessed through a system model of inputs, processes, outputs and outcomes (short-, medium- and long-term) or by adopting a continuous quality improvement framework, composed of a number of quality dimensions that can be explored through questions such as the ones listed below:
- Are all the diagnostic and treatment services *accessible* (ensuring coverage and timeliness) to the target population?
- Are the services *acceptable* (ensuring providers' and patients' satisfaction) and *appropriate* (based on established standards) for the target groups?
- Are the *competencies* (knowledge and skills) of the providers appropriate for the services needed?
- Is there *continuity* (integration, coordination and ease of navigation) in the activities of the diagnosis and treatment programme?
- Are the diagnostic and treatment services *safe* for providers, patients and the environment?
- Are the diagnostic and treatment services *effective* (in terms of cure or improved survival) and *efficient* (providing the best results at the lowest cost)?

ASSESSING THE EFFECTIVENESS OF DIAGNOSTIC AND TREATMENT SERVICES

In the medium and long term, an effective diagnosis and treatment programme, with good coverage of the target groups, should result in:

- improvement in 5- and 10-year survival and cure rates for patients with the targeted cancers;
- improved quality of life for cancer survivors;
- decreased mortality among patients with the targeted cancer types.

ASSESSING THE EFFICIENCY OF DIAGNOSIS AND TREATMENT PROGRAMMES

Diagnosis and treatment programmes can achieve very different results with the same level of resources. Programmes are particularly efficient if they target *curable* cancers.

It is unfortunately not rare, in low-resource settings, to see a local government investing in hugely expensive cancer treatments, such as bone marrow transplant units. Only a few very high-income patients will be able to afford such costly treatment, and their chances of survival will be low. The same level resources could, however, be used to treat hundreds of children, including those from low-income families, who have acute lymphatic leukaemia, for which cure rates are potentially over 80%.

Relevant questions to ask in order to assess the efficiency of diagnosis and treatment programmes are shown in Table 3.

ASSESSING PATIENT SAFETY IN DIAGNOSIS AND TREATMENT PROGRAMMES

Patient safety is achieved by avoiding, preventing or ameliorating adverse outcomes or injuries stemming from the processes of health care (WHO, 2005). In the United States of America, the National Cancer Institute has recommended common terminology for reporting adverse events, applicable to all oncology clinical trials regardless of chronicity of adverse events or modality of treatment. This terminology is useful in assessing the safety of all health-care interventions (National Cancer Institute, 2003).

To assess whether a diagnosis and treatment component is safe in a country or region, it is useful to pose the following questions:

HOW MANY PATIENTS PER YEAR EXPERIENCE MEDICAL ERRORS OR SUFFER INJURIES ASSOCIATED WITH THE DELIVERY OF DIAGNOSIS AND TREATMENT PROCEDURES?

When answering this question, it is instructive to consider any possible complications of diagnostic tests and treatment, medication errors, side-effects of medications, critical incidents and psychosocial consequences of treatment, and also any associated quality-of-life aspects.

Table 3. Questions to help assess the efficiency of cancer diagnosis and treatment programmes

Efficiency measure	Basic question(s)	Examples of specific questions relating to diagnosis and treatment programmes: the answer "yes" means that the programme is efficient
Technical efficiency (using given resources to maximum advantage)	Could we produce the same outcome with fewer resources?	○ Is the treatment programme directed at the right target groups? For example, is the programme directed at patients with early stages of cancer, rather than those with advanced cancer? ○ Is the amount of over-treatment insignificant? For example, are recommended conservative procedures, rather than more invasive ones, used to treat cervical cancer in-situ? ○ Are staff adequately trained and do they perform well? ○ Is there adequate equipment for optimal diagnosis and treatment? ○ Are facilities and supplies being fully used? ○ Are we using all available information? ○ Are we helping patients to adhere to their treatment and care regimes? For example, are we educating patients about their disease and treatment, and empowering them to cope effectively?
Productive efficiency (choosing different combinations of resources to achieve the maximum health benefit for a given cost)	Could we improve the health outcome for a given cost?	○ Have we reallocated the available diagnostic and treatment resources, and targeted patients with curable cancers, to obtain better outcomes? ○ Have we redistributed the diagnostic and treatment resources to underserved groups within the target population? ○ Do we complete the diagnostic, treatment and follow-up protocol in patients with early symptoms of cancer? ○ Do we maintain and develop the performance of health workers? ○ Do we maintain a level of workload that is between the minimum and maximum standards? ○ Do we maintain adequate standards of diagnostic and treatment service provision through quality assurance? ○ Do we provide appropriate advice and counselling for patients and their families to help them cope with their situation?
	Could we reduce costs for a given outcome?	Based on the evidence, are we using the most cost-effective: ○ early detection tests? ○ definitive diagnostic tests? ○ treatment options? ○ follow-up options? ○ health workers? ○ strategies to identify those at high risk for emotional distress? ○ strategies to empower the target groups to take more responsibility for their own decisions? ○ strategies to reach the target groups? ○ strategies to reach patients with abnormal results and refer them for further investigations? ○ strategies to follow up patients who have been treated? ○ strategies to improve the performance of health workers? ○ strategies for quality control?
Allocative efficiency (achieving the right mixture of health-care programmes to maximize the health of society)	Could we improve the health of society by choosing a better mix of programmes?	○ Do we choose the most cost-effective and affordable diagnosis and treatment interventions for the population? ○ Do we choose the most cost-effective and affordable cancer prevention and palliative care interventions for the population?

WHAT ACTIONS ARE BEING TAKEN TO ENSURE PATIENT SAFETY IN RELATION TO THE DELIVERY OF DIAGNOSIS AND TREATMENT PROCEDURES?

- Is there a system to identify medical errors and causes of patient injury?
- Are practices being implemented that eliminate medical errors and systems-related risks and hazards?

> For more information on patient safety, go to
> http://www.who.int/patientsafety/reporting_and_learning/en/

ASSESSING CUSTOMER SATISFACTION WITH DIAGNOSIS AND TREATMENT SERVICES

Customer satisfaction is the state of mind that customers (patients and their families) have when their expectations have been met or exceeded. Customer satisfaction is subjective.

To establish whether a diagnosis and treatment programme for cancer is producing customer satisfaction, it is useful to ask the following questions:

- Do patients comply with treatment and follow-up?
- Is customer satisfaction improving over time?
- How many formal complaints have been received?
- What are customers' expectations, preferences, needs and requirements?
- Are the services designed to meet customers' expectations, preferences, needs and requirements?

ASSESS THE SOCIAL CONTEXT

The development of a diagnosis and treatment plan and programme requires a thorough understanding of the context. The integration of social context with the diagnosis and treatment plan will considerably enhance acceptance of the plan, both politically and socially. One way to do this is through an analysis of the **s**trengths, **w**eaknesses, **o**pportunities and **t**hreats (SWOT analysis) of the existing plan and related activities.

During the course of a SWOT analysis, the following questions should be answered:

WHAT ARE THE STRENGTHS AND WEAKNESSES ASSOCIATED WITH PLAN DEVELOPMENT AND IMPLEMENTATION?

These are factors affected by internal forces, such as political support, leadership, stakeholders' involvement and resources available. For example, politicians and decision-makers are usually supportive of treatment services for cancer but they do not prioritize cost-effective and affordable treatments, and thus often neglect or overlook prevention, early detection, rehabilitation and palliative care.

WHAT ARE THE OPPORTUNITIES AND THREATS ASSOCIATED WITH PLAN DEVELOPMENT AND IMPLEMENTATION?

These are factors affected by external forces, such as the international cancer control agenda, the political and economic situation within the country, and the existence of other pressing health priorities. For example, the fact that WHO and its international partners are promoting a balanced approach to cancer control interventions – from prevention to end-of-life care – represents an opportunity to advocate for the development of more effective and efficient national policies for diagnosis and treatment.

> For further information, including details of international organizations working in cancer diagnosis and treatment, go to
> http://www.who.int/cancer/modules/en/index.html
>
> (i) WWW

SELF-ASSESSMENT BY COUNTRIES

WHO has developed a set of self-assessment tools for assessing, at different levels of complexity, the population cancer needs and existing services. A description of the tools can be found in the *Planning* module.

> Self-assessment tools, which can be adapted to country circumstances, are available from the WHO web site
> http://www.who.int/cancer/modules/en/index.html
> The WHO web site also provides links to sources containing more specific tools for assessing the needs and existing services for diagnosis and treatment of cancer.
>
> (i) WWW

PLANNING STEP 2
Where do we want to be?

The assessment exercise described in the previous section (planning step 1) aims to identify the gaps in services, as well as in data and knowledge, with regard to the burden of curable cancers and cancers that are treatable but not curable.

The next step is to consider what *could* be done, given limited resources and capacity, in order to answer the question: Where do we want to be?

DEFINE THE TARGET POPULATION FOR DIAGNOSIS AND TREATMENT

The selection of the target population for a diagnosis and treatment plan depends on the burden of curable cancers and cancers that are treatable but not curable.

In the case of *curable cancers*, the target population will be the following:

- all patients of a certain age group and sex in which an abnormality indicative of cancer has been detected through an early detection examination or test, or by chance during a routine examination;
- all patients, particularly children, that present with signs and symptoms of a cancer that has a high potential for being cured.

In the case of *cancers that are treatable but not curable*, the target population will be all patients who present with cancers and who could benefit from treatment because they could have their lives prolonged considerably and their quality of life improved.

IDENTIFY GAPS IN DIAGNOSTIC AND TREATMENT SERVICES

Using the results of the assessment, the gaps in diagnosis and treatment service provision can be identified (present state versus desired state) and potential corrective interventions considered. For example, if, as is often the case in resource-constrained countries, the majority of cervical cancer patients are presenting in advanced stages, the introduction of a well-organized early detection programme coupled with timely diagnosis and treatment could eventually have a significant impact on survival rates and thus reduce substantially the mortality from cervical cancer.

It is important to assess the impact of diagnosis and treatment interventions previously implemented in the target population, and also of those that have been successfully applied elsewhere, particularly in similar socioeconomic and cultural settings.

SET OBJECTIVES FOR DIAGNOSTIC AND TREATMENT SERVICES

The objectives of diagnostic and treatment services should respond to the needs of people who have *curable cancers* or *cancers that are treatable but not curable.* The objectives should be directly related to the identified gaps in services. For a diagnosis and treatment plan to be effective, all process and outcome objectives need to promote the common goal of improving survival and reducing mortality among the targeted population.

Table 4 provides examples of short-, medium- and long-term process and outcome objectives for diagnosis and treatment, according to the level of resources.

ASSESS THE FEASIBILITY OF DIAGNOSTIC AND TREATMENT INTERVENTIONS

The feasibility of diagnosis and treatment interventions in a given population depends on the skills and infrastructure available, the knowledge and attitudes of the target population, and the motivation of the government and health-care providers.

For a diagnosis and treatment programme to be effective, it should target people with curable cancers, and it should deliver good quality services (early detection, diagnosis, treatment and follow-up) equitably – usually for an indefinite duration – to all members of the target population.

For decades some resource-constrained countries, where a high proportion of patients present with cancers in advanced stages, have invested in costly and often ineffective treatments which serve relatively few patients. As a consequence, there has been no improvement

Table 4. Examples of short-, medium- and long-term objectives for diagnosis and treatment services, using WHO's stepwise approach

Component	Core (with existing resources)	Expanded (with a projected increase in, or reallocation of, resources)	Desirable (when more resources become available)
Overall goal	○ To reduce mortality from common curable cancers ○ To ensure that prioritized diagnosis and treatment services are provided in an integrated, equitable and sustainable way		
Short-term process and outcome objectives (within 5 years)	○ To increase awareness to over 40% among the general population and health-care providers of early signs and symptoms of the top two or three cancers that can be detected early ○ To achieve early referral and adequate diagnosis and treatment in specialized clinics for over 50% of patients, identified by the early detection strategy ○ To provide education and support to over 50% of patients diagnosed with cancer	○ To increase awareness to over 60% among the general population and health-care providers of early signs and symptoms for all cancers that can be detected early ○ To achieve early referral and adequate diagnosis and treatment in specialized clinics for over 70% of all patients, identified by the early detection strategy ○ To provide education and support to over 70% of patients diagnosed with cancer	○ To increase awareness to over 80% among the general population and health-care providers of early signs and symptoms for all cancers that can be detected early ○ To achieve early referral and prompt treatment in specialized clinics for over 90% of patients with cancers that can be detected early ○ To provide education and support to over 90% of patients diagnosed with cancer
Medium-term outcome objectives (5–10 years)	○ To increase by 30% the 5-year survival rate of patients with the top two or three cancers that can be detected early ○ To achieve over 40% cure rates in children with acute lymphatic leukaemia and Hodgkin lymphoma	○ To increase by 50% the 5-year survival rate of patients with cancers that can be detected early ○ To achieve over 60% cure rates in children with acute lymphatic leukaemia and Hodgkin lymphoma	○ To increase by 70% the 5-year survival rate of patients with cancers that can be detected early ○ To achieve over 80% cure rates in children with acute lymphatic leukaemia and Hodgkin lymphoma
Long-term outcome objectives (10–15 years)	○ Through early diagnosis and treatment, to reduce by 20% the mortality from the top two or three cancers that can be detected early ○ To reduce by 20% the childhood mortality from acute lymphatic leukaemia and Hodgkin lymphoma	○ To reduce by 30% the mortality from all cancers that are amenable to early diagnosis and treatment ○ To reduce by 40% the childhood mortality from acute lymphatic leukaemia and Hodgkin lymphoma	○ To reduce by 50% the mortality from all cancers that are amenable to early diagnosis and treatment ○ To reduce by 60% the childhood mortality from acute lymphatic leukaemia and Hodgkin lymphoma

in survival rates and no reduction in mortality in the population. The same countries have typically neglected to introduce low-cost interventions, such as early detection for the most common detectable cancers, even though cancer in early stages generally requires less costly and less complex interventions. Furthermore, failures to provide low-cost palliative care to the patients diagnosed in late stages, has meant needless suffering for patients and their families in many of these countries.

ADDRESS ETHICAL ASPECTS

Important ethical principles that apply when treating cancer patients are autonomy and distributive justice:

- Respect for patients' autonomy means that patients are given the opportunity to make choices. Diagnostic and therapeutic interventions should be performed only with the informed consent of the patient. Caregivers need to be sensitive to, and respect, the values of their patients, especially if they are from different cultural backgrounds.

- Equitable distribution of resources is an important ethical concern in cancer diagnosis and treatment. Both the equipment and drugs necessary for treating cancer are expensive and likely to consume a large component of the health-care budget, sometimes to the benefit of only a few patients (e.g. bone marrow transplantation). Although the basic principles of cancer treatment are the same throughout the world, the specific treatment approaches adopted in each country (surgery, radiotherapy, chemotherapy) will have to take into account the availability of human, psychosocial, physical and financial resources. Public health planners must carefully consider the relative merits of allocating scarce resources to more sophisticated yet more expensive treatments that may benefit only a small number of patients and investing in lower cost interventions that have the potential to reach greater numbers of people.

- Similar considerations arise in relation to the use of new treatments that rely on advanced technology. Before such technology is imported from developed countries into less developed areas, due account should be taken of local circumstances, and of the need for medical and technical personnel trained in its use. Policy-makers, especially those working in developing countries, should bear in mind that newer diagnosis and treatment approaches are often costly and may be of low or unproven efficacy. In considering the use of such advanced treatments, policy-makers must weigh the expected results against the effect of diverting resources from the more established, proven treatment options.

SET PRIORITIES FOR DIAGNOSTIC AND TREATMENT SERVICES

It is essential to set priorities, because resources will never be able to meet all health needs. Priority-setting is particularly important in resource-constrained contexts, because of the need to make the best use of very limited resources. It is imperative therefore that the committee guiding the overall cancer control planning process establish criteria for selecting priorities.

To ensure that diagnosis and treatment services are effective and efficient, they should be part of a national cancer control plan and they should initially prioritize people with curable cancers. Later, when more resources become available, services should be extended to people with cancers that are treatable but not curable, ensuring full coverage of all patients suffering from cancer.

General recommendations for setting priorities according to the level of resources available (WHO, 2002) are summarized in Table 5.

Table 5. Organizing diagnosis and treatment services according to resource levels, using WHO's stepwise approach

Core (with existing resources)	Expanded (with a projected increase in, or reallocation of, resources)	Desirable (when more resources become available)
Organize diagnostic and treatment services, giving priority to people with the more common curable cancers	Organize diagnostic and treatment services, giving priority to people with curable cancers and cancers that are treatable but not curable	Reinforce the network of comprehensive cancer centres that are active in clinical training and research, giving special support to the ones acting as national and international reference centres

To prioritize cancer diagnosis and treatment strategies for curable cancers and ensure the continuum of care, take the following steps:

- First choose the target cancer types from among those which are curable (see Table 1) according to:
  - the burden the different types of cancer represent in terms of mortality and morbidity;
  - the proportion of cases in advanced stages;
  - the societal impact of the disease (e.g. cancers that affect relatively young people).

- Second, for each selected curable cancer, amenable to early detection, choose an early detection strategy (see *Early Detection* module), which will be linked to the treatment strategy, on the basis of:
  - cost-effectiveness;
  - affordability;
  - sustainability;
  - political attractiveness.

- Third, for each selected curable cancer, choose the diagnosis and treatment interventions on the basis of:
  - cost-effectiveness;
  - resource-level appropriateness (see box below);
  - affordability;
  - sustainability.

- Fourth, for all cancers that do not respond to treatment or are diagnosed in late stages, choose palliative care interventions (see *Palliative care* module) on the basis of:
  - cost-effectiveness;
  - affordability;
  - sustainability.

For more information on selecting cost-effective interventions, go to
http://www.who.int/choice/interventions/en/

Resource-level-appropriate treatment for curable cancers.

The concept of "resource-level appropriateness" recognizes that more than one intervention may be effective for curable cancers. The most appropriate choice for a low- or middle-income country may not be the current choice in New York or Paris. For example, breast-conserving surgery for early-stage breast cancer requires prior treatment with radiotherapy. If radiotherapy is not available, more extensive surgery may also be life saving, while maintaining a good quality of life.

The range of treatment choices is not always available, however, a major exception is a recent, highly innovative effort, the Breast Health Global Initiative, which is an international collaboration with a wide range of partners from high-, middle- and low-income countries. The Breast Health Global Initiative has produced a comprehensive set of resource-specific, stage-specific evidence-based guidelines, which will be updated biannually, for all aspects of breast cancer management.

Source: Anderson BO et al. (2006) Breast cancer in limited-resource countries: An overview of the Breast Health Global Initiative 2005 guidelines. *Breast Journal* 12 (Suppl. 1): S3-S15. For more information on the work of Breast Health Global Initiative, go to: http://www.fhcrc.org/science/phs/bhgi

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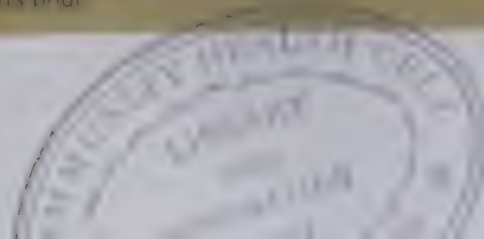
PLANNING STEP 3
How do we get there?

What can be done with available resources? Having identified objectives for the diagnosis and treatment programme, the next step is to formulate an action plan to achieve them.

> A template for developing a detailed action plan is provided at
> http://www.who.int/cancer/modules/en/index.html
>
> (i) **WWW**

When developing a diagnosis and treatment plan, it is important to consider the relationship with early detection and palliative care activities. To be effective, a diagnosis and treatment programme that primarily targets people with curable cancers will need to be linked to early detection activities. At the same time, treatment services need to be linked to those for palliative care when the disease is advanced and there are no longer chances of cure. Treatment services must also raise awareness among cancer patients, cancer survivors, family and community members about cancer risk factors and the need for preventive measures to avoid cancer. (See also the *Prevention*, *Early detection* and *Palliative care* modules.)

The process of translating a diagnosis and treatment plan into action requires strong leadership and competent management. It also requires a participatory approach to identify what actions are needed and in what order. The actions that are feasible and sustainable will need to be implemented gradually in order to bridge the gaps identified during planning step 2.

BRIDGE THE GAPS

It is important to evaluate the actions to bridge the gaps in service provision from the perspective of those who support and will eventually implement those actions, as well as from the perspective of any potential opponents. Next, there is a need to identify the key person (or group) with the power to decide on the plan, and then see how that person (or group) can be activated to make the planned changes.

Table 6 provides examples of actions to bridge gaps in cancer control that would be appropriate in a low-income country. In this particular case, the decision has been made to prioritize *early diagnosis* (i.e. increase awareness of early signs and symptoms) of breast and cervical cancers, and the *diagnosis and treatment* of all patients identified by the early detection activities, as well as *all children presenting with acute lymphatic leukaemia*. The country has chosen to implement activities gradually, both in terms of the location of the target population (i.e. activities will initially target patients identified through the formal health system before widening contact through community outreach schemes) and their geographical scope (i.e. if successful in a demonstration area, programme activities will be expanded to other areas, and ultimately to the whole country).

RAISE THE NECESSARY RESOURCES

A diagnosis and treatment programme should be accompanied by a resource plan. The resource plan should list existing resources and outline possible strategies for acquiring needed resources from both governmental and nongovernmental sources.

Starting or reinforcing diagnostic and treatment services as part of a national cancer control plan is a costly and complex undertaking. For example, in the case of radiotherapy, it involves much more than simply procuring the necessary facilities and equipment. It also comprises organizing staffing, provision of supplies, preventive maintenance and repairs, source replacement, an adequate stock of spare parts, and safety measures for patients and health-care providers.

To make sure that the necessary human, physical and financial resources are available to implement the diagnosis and treatment programme, the following questions need to be answered:
- What resources are currently dedicated to cancer control?
- What resources are specifically allocated to diagnosis and treatment?
- How can current resources be reallocated or shared to achieve the objectives of the diagnosis and treatment programme?
- Besides resources currently being expended for diagnosis and treatment, what else is needed to achieve the objectives of the diagnosis and treatment programme?
- What potential sources (internal and external) of funding or other resources are available to meet these needs?
- How can partners work together to raise funds from government or the private sector?

Table 6. Examples of actions to bridge identified gaps in cancer control in a low-resource country

Health situation	Level of interventions	Key actions in a selected geographical area served by the regional cancer centre	Who has the power to decide on key actions?	How could they be activated to decide?
GAPS (difference between OBSERVED and DESIRED status)	**CORE**			
	With existing resources	For the selected cancer types, elaborate and disseminate standards for early diagnosis, referral, follow-up and clinical management, including psychosocial support, pain relief and palliative care	The local health authorities together with the leading health-care professionals of relevant sectors, supported by the national authorities	By providing relevant information on the problem and its possible solutions through personal interactions and meetings with the relevant stakeholders, using the testimonies of patients and health-care providers
OBSERVED STATUS High mortality from breast and cervical cancer		Identify the specific target groups, estimate the demand for services, and reorient referral mechanisms and diagnostic, treatment and palliative care services to ensure timeliness and quality of actions		
Over 80% of breast and cervical cancer patients are diagnosed in very late stages		Include palliative care medication, as well as the chemotherapy drugs and antibiotics used for treating paediatric acute lymphatic leukaemia, in the national essential medicines list		
Less than 20% of children with acute lymphatic leukaemia have access to full treatment and over 80% die within 5 years		Establish outpatient clinics for ambulatory treatment and follow-up		
		Include early detection, diagnostic, treatment and palliative care packages in the health insurance scheme		
DESIRED STATUS Reduction in breast and cervical cancer mortality		Ensure full coverage of diagnosis and treatment for patients from underprivileged communities		
Not more than 20% of breast and cervical cancer cases diagnosed in late stages		Train health-care professionals at all levels of care and introduce adequate referral mechanisms Train family caregivers and promote the formation of parents/patients support groups Create a basic information system to monitor and evaluate related activities at different levels of care		
Over 70% of children with acute lymphatic leukaemia have access to full treatment and over 60% survive for 5 years	**EXPANDED**			
	With a projected increase in, or reallocation of, resources	Identify partners in the community and develop joint educational strategies for early detection of breast and cervical cancers aimed at the target women	Local authorities from political, health and educational sectors, supported by the national authorities	By disseminating the results of the evaluation of previous (core) activities
		Adjust the primary health-care services and the specialized clinical services to meet the estimated increase in demand for breast and cervical cancer care	Health-care and community leaders, traditional healers	By advocating to reach more women in the target age group attached to community organizations
STRENGTHS Existence of specialized diagnostic and treatment facilities, strong primary health care network and community health initiatives in some geographical areas		Correct weaknesses identified through the monitoring and evaluation system Improve quality and coverage of diagnostic, treatment and palliative care services for acute lymphatic leukaemia in children, and mobilize further social support for patients and their families		
Health insurance system under development	**DESIRABLE**			
	When more resources become available	Develop educational strategies and low-cost media campaigns for early detection of breast and cervical cancer aimed at all women	National and local leaders in the political, health and educational sectors	By disseminating the results of the evaluation of previous (core and expanded) activities
A ward for treating children with acute lymphatic leukaemia recently inaugurated		Develop special strategies for increasing the adherence to treatment of children with acute lymphatic leukaemia	Health-care and community leaders	By advocating to reach all women in the target age group in the whole selected community via community outreach
		Monitor the activities and evaluate the results	Leaders of national and local associations	
		If the evaluation in the target areas is satisfactory, start mobilizing resources to expand activities to the rest of the country using a similar stepwise approach		By advocating to expand activities to the rest of the country

A major policy issue is how to ensure adequate and equitable resource mobilization for health care. Different forms of health system financing exist, which vary in terms of how resources are generated, pooled and used.

Information on the key policy issues related to health financing, along with relevant policy tools to aid decision-making, can be accessed at the WHO web site
http://www.who.int/health_financing/en/

(i)

www

The diagnosis and treatment component of a national cancer control plan should be accessible to a large majority of people with cancers that are curable or treatable but not curable. Also, services should be delivered in an equitable manner. In a low-income country, if diagnosis and treatment activities are too ambitious – involving costly interventions and sophisticated technologies – it will not be possible to implement the plan even if there is political will and commitment. For example, the scarce resources of low-income countries are often dedicated to ineffective treatment of advanced cancer patients, even though many of the cancers would have been amenable to early detection. If, instead, advanced cancer patients were to receive good quality and low-cost palliative care, a significant amount of resources could be reallocated to early detection, diagnosis and treatment of people with curable cancers. This in itself would eventually reduce the numbers of people with advanced cancers.

"Despite the billions of dollars spent each year on an ever-increasing array of medical devices and equipment, the majority of countries still regard the management of devices as a procurement issue, rather than an integral part of public health policy. Around 95% of medical technology in developing countries is imported, much of which does not meet the needs of national health care systems" (WHO Department of Essential Health Technologies).

(i)

www

For information on WHO's strategies and tools to assist national health authorities in the selection, procurement, use and disposal of high-quality medical devices, go to
http://www.who.int/medical_devices/en/

ORGANIZE DIAGNOSTIC AND TREATMENT SERVICES

The development of efficient, equitable and patient-centred diagnostic and treatment services, within a national cancer control plan, requires the following sequence of actions:

- working with networks to establish a team approach;
- making a realistic estimate of the demand for services in the target population of patients with cancers that are curable or treatable but not curable (see planning step 2);
- drawing up clear referral guidelines and establishing referral mechanisms for all cases detected with abnormalities indicative of cancer;
- developing national diagnosis, treatment and follow-up guidelines for the targeted cancers, including minimum standards of care and quality control mechanisms;
- developing an essential list of medicines for treating the targeted cancers;
- ensuring that diagnosis, treatment and follow-up services are organized and managed across all levels of care, in accordance with the national guidelines;
- ensuring access, quality, safety and continuity of care within communities, including self-management training and support for patients;
- ensuring that palliative care services are available for all patients with advanced cancer when treatment is no longer effective or cannot be provided;
- establishing a well-functioning system for health information and patient records;
- ensuring the availability of adequately trained staff who are capable of working with the right medicines and equipment, in the right facilities and with adequate financing;
- creating an organizational environment that provides continuous training and incentives to providers and users.

The above list of actions, which is based on WHO's health system building blocks, involves processes of different levels of complexity. WHO recommends a stepwise implementation, based on the availability of resources and adapted to the particular conditions in the country.

For further information on WHO's framework for strengthening health systems, go to
http://www.who.int/healthsystems/strategy/everybodys_business.pdf

WORKING WITH NETWORKS TO ESTABLISH A TEAM APPROACH

Following the development of a cancer diagnosis and treatment plan, it is important for countries to create optimal conditions for implementation of the programme. These conditions include continuous political, social and financial support, adequate leadership, sufficient numbers of trained health-care practitioners working in multidisciplinary teams with clearly defined roles and functions at the different levels of care, as well as effective national and international collaborative networks for sharing knowledge and experience.

In recent years, the number of countries participating in international collaborative projects has steadily increased. In paediatric oncology, in particular, there are now several examples of highly successful "twinning programmes" which have forged links between paediatric oncology centres in developed countries and units in countries with limited resources to the mutual benefit of both parties (Barr et al., 2002; Bonilla, Ribeiro, Wilimas, 2006). Nicaragua's experience is described on page 28.

> WHO has developed a tool for team building, go to
> http://www.who.int/cancer/modules/Team%20building.pdf
> (i)
> WWW

ESTIMATING THE DEMAND FOR SERVICES

When estimating the demand for different diagnostic and treatment services it is important to consider the prevalence of patients with cancer types that have been prioritized in the plan, including advanced cancers. It is also important to take into account the clinical protocols and the technologies used for management and follow-up of these patients, as well as the support and rehabilitation measures needed for patients and their families.

The majority of advanced cancer patients will need simple diagnostic procedures (microscopic verification or imaging) and approximately 20% may benefit from palliative surgery, radiotherapy, chemotherapy or other procedures which can improve their quality of life to a certain extent (Sausville, Longo, 2005). Table 7 provides examples of the uses of palliative surgery, radiotherapy and chemotherapy in advanced cancer patients.

NICARAGUA
Model programme for cancer treatment in a low-income country

The decision to organize the Diagnosis and Care Programme for Children with Cancer in Nicaragua, the second poorest country in Latin America, was taken over 20 years ago, during a period of great political and social instability. The decision was based on the principle that Nicaraguan children have the same right as those from developed countries to be cured of diseases – not only diseases of poverty, but also other diseases, such as cancer. The right to health care cannot be denied. It is a basic human right, as fundamental as the right to life.

The Diagnosis and Care Programme for Children with Cancer was planned to provide long-term services. Although the initial focus was on acute lymphoblastic leukaemia, a frequently curable and relatively common childhood cancer, provision was made to eventually include the full range of childhood cancers in the programme.

A twinning arrangement was agreed between an oncology centre in Monza, Italy, and the children's hospital, La Mascota, in Nicaragua. This has proved to be a rewarding experience for health-care teams in both Italy and Nicaragua. Initially, seven paediatricians were trained in haemato-oncology at the Haemato-oncology Centre of San Gerardo Hospital in Monza. Training was also provided – at different centres – for a surgical oncologist, two pathologists and seven nurses, as well as laboratory and pathology technicians. Subsequently, facilities to provide care to children with cancer were set up in Nicaragua.

Various sources of funding were identified, both at the national and international levels, to ensure the financial independence and long-term sustainability of the programme. At present, there are 32 beds, an operating room, a day hospital for outpatients, a haematology laboratory and a hostel that provides accommodation for patients who live far from the centre. Antineoplastic drugs and support therapy are provided by the Nicaraguan Committee for Supporting Children with Cancer (CONANCA). All patients are treated free of charge.

A new project was launched in 2007 to decentralize and coordinate haemato-oncology care in other departments of the hospital. This project aims to decrease delays in diagnosis, continue to reduce abandonment of treatment, improve treatment compliance, and care for terminally ill patients. Each type of cancer is treated according to international evidence-based protocols, adapted to the local context. From the beginning, the multidisciplinary teams that provide care have adopted a holistic and psychosocial approach.

Because the role of the nursing staff is of vital importance in caring for children with cancer, two specific programmes have been developed, one on quality of nursing, the other on nursing leadership. These programmes have helped to motivate nurses and have facilitated their training.

A strategic alliance has been formed between the health professionals, CONANCA and the Association of Parents of Children with Cancer. This alliance has sensitized health authorities, as well as governmental and nongovernmental organizations to the importance of diagnosing and treating cancer. The alliance has also contributed to mobilizing resources for the programme.

The programme at La Mascota has provided a model for the development of other services within Nicaragua and beyond. Programme sustainability allowed for the creation of Monza's International School of Paediatric Haemato-oncology (MISPHO) in 1996, with the participation of 14 Latin American countries, to promote twinning programmes similar to the one in Nicaragua and assist in the training of the participating doctors. Following the subsequent founding of the Central American Association of Paediatric Haemato-oncology (AHOPCA), there has been a real interaction between the haemato-oncology centres in the participating countries.

Sources: Masera G et al. (2006). *Twinning between pediatric hematology-oncology centres in low-and high income countries: 20 years of collaboration between Italy and Latin America.* Educational Book. Congress of American Society of Clinical Oncology, USA. Additional information supplied by Dr Fulgencio Baez, Department of Haematology-oncology, Children's Hospital La Mascota, Nicaragua.

Table 7. Examples of uses of surgery, radiotherapy and chemotherapy to palliate symptoms in advanced cancer patients

Surgery	Radiotherapy	Chemotherapy or hormone therapy
o Ostomy and bypass to correct obstructions of urinary and digestive tract o Locoregional control of disease in appropriately selected patients (e.g. breast cancer) o "Toilet" surgery, to control fungating cancers or recurrence and progression of disease, to control pain, to relieve spinal cord compression or airways obstruction o Debulking of disease (e.g. ovarian cancer) o Resection of metastatic disease with curative intent	o To control profuse bleeding from a tumour o To relieve compression of the superior vena cava o To relieve pain secondary to bone metastasis o To relieve symptoms caused by spinal cord compression or cerebral metastasis o To relieve severe dysphagia from oesophageal obstruction	o To shrink a tumour o To relieve pain or distress in advanced cancer, such as oropharyngeal cancer, nasopharyngeal cancer or prostate cancer

IMPLEMENTING DIAGNOSIS AND TREATMENT SERVICES

Figure 1 shows how cancer diagnostic and treatment services, including rehabilitation, psychosocial support and patient education programmes, might be distributed across the levels of care and within the community. Each country needs to elaborate its own organizational model taking into consideration the targeted cancers; the physical, emotional, social and spiritual needs of patients and their families; and the complexity, cost-effectiveness and affordability of interventions.

WHO recommends that the less complex diagnosis and treatment services are located in places that are easily accessible to the target groups at the district level. The more complex and specialized services can be centralized at the regional or national level, where the expertise and more sophisticated technologies are concentrated and can be provided in a sustainable manner. Collaborative networks of professionals, working in diagnosis, treatment, rehabilitation and psychosocial support within and across levels of care, as well as in the community, are necessary to ensure the best results.

Figure 2 provides a map of a typical patient's pathway. This pathway should be considered when planning and organizing referral mechanisms, and when coordinating services within and across levels of care. Patients' journeys need to be monitored and evaluated in order to ensure delivery of timely and good quality services.

Figure 1. Distribution of cancer diagnostic and treatment services across the levels of care in a typical middle-income country

Tertiary care level
(national or regional hospital)
<u>Diagnosis</u>
Imaging: X-ray, ultrasonography, mammography, computerized tomography (CT) scan, endoscopy
Laboratory: Cytology, haematology, histopathology, prognostic markers, immunochemistry
<u>Treatment</u>
Radiotherapy, complex surgery and chemotherapy, rehabilitation, psychosocial support,
self-help groups, patient education programmes

Secondary care level
(district hospital)
<u>Diagnosis</u>
Imaging: X-ray, ultrasonography, mammography, endoscopy
Laboratory: Cytology including fine-needle aspiration, haematology, biopsy, routine histopathology
<u>Treatment</u>
Moderately complex surgery and chemotherapy (mainly outpatient clinics), rehabilitation, psychosocial support,
self-help groups, patient education programmes

Primary care level
Early referral of suspicious cases, simple surgical procedures (e.g. cryotherapy of pre-cancerous lesions of the cervix),
retrieval of patients who abandon treatment, patient support groups, patient education and rehabilitation,
education and training of community caregivers including traditional healers

In organizing cancer diagnostic and treatment services it is also important to take into account that people around the world are every day making improvements in health as a direct benefit of innovative approaches using information and communication technologies, such as telemedicine. Telemedicine provides rapid access to shared and remote medical expertise and may prove to be a feasible solution for increasing access to specialty cancer diagnostic and treatment services throughout a country or across countries. For example, telepathology was employed to achieve teleconsultation between a tertiary cancer referral centre, Tata Memorial Centre in Mumbai, India, and a rural hospital. The evaluation showed that it was possible to have good pathology consultation in 99% cases (Desai et al., 2004).

For more information on the use of telemedicine in
oncology in developing countries, go to
http://ipath.ch/site/network

Figure 2. A patient's pathway
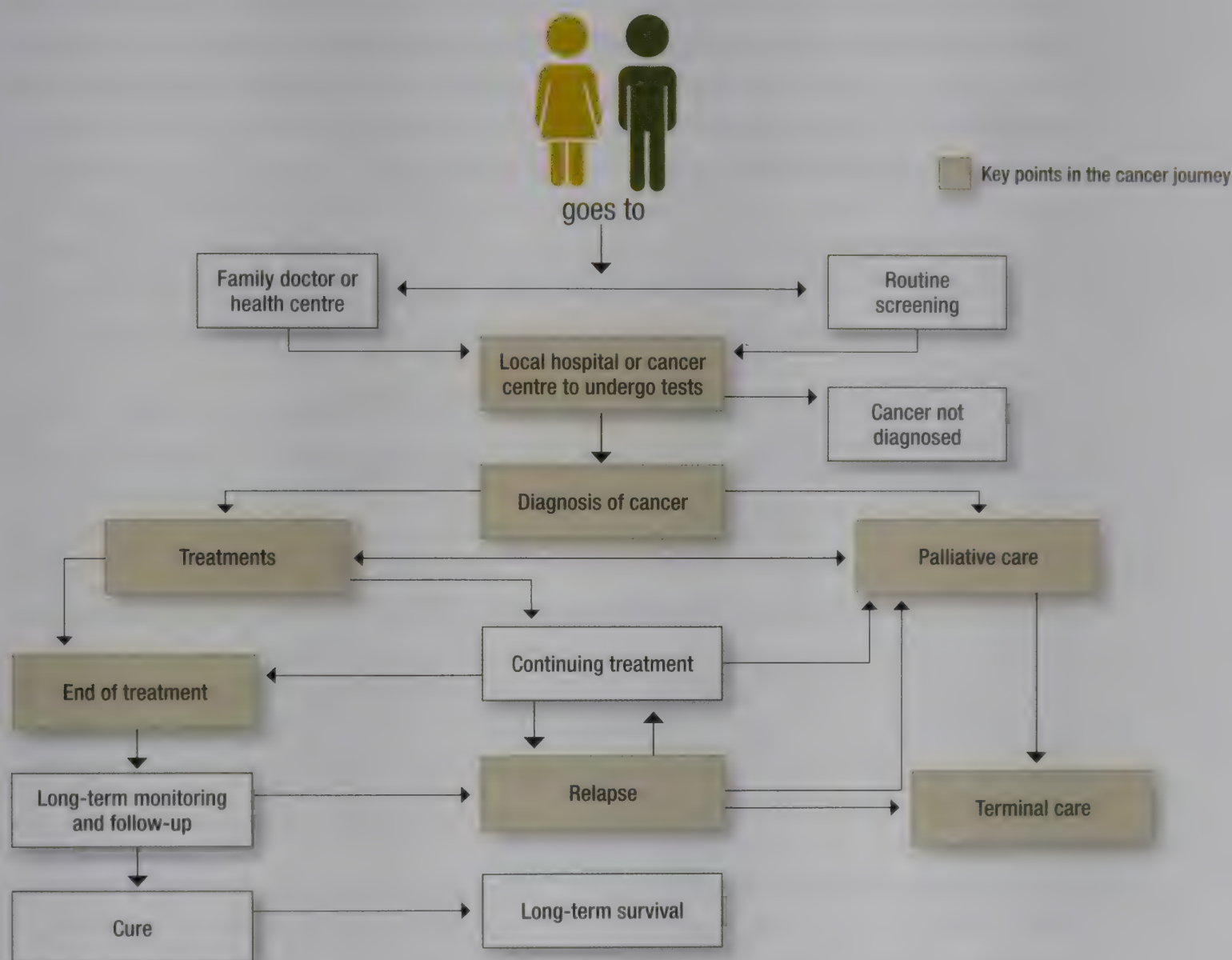
Source: Fitch M (2003). Supportive care: rebalancing efforts. In: Sullivan T et al., eds. *Strengthening the quality of cancer services in Ontario*. Ottawa, CHA Press: 141–163.

DIAGNOSTIC SERVICES

Diagnostic services within a national cancer control plan aim to provide timely clinical and histopathological confirmation of cancer in all suspected cases. Diagnostic services are also required for staging of the disease, monitoring treatment and response and follow-up investigations. Physical examination, imaging procedures, laboratory tests and pathology reports which include detailed examination of surgical specimen not only allow cancer to be confirmed but also provide information to determine the stage of the cancer (Longo, 2005; Sausville, Longo, 2005). Cancer staging helps the doctor plan a person's treatment and estimate prognosis (see key definitions, page 4).

Figure 1 illustrates a rational distribution of diagnostic services, where more complex and costly procedures are concentrated at the tertiary level.

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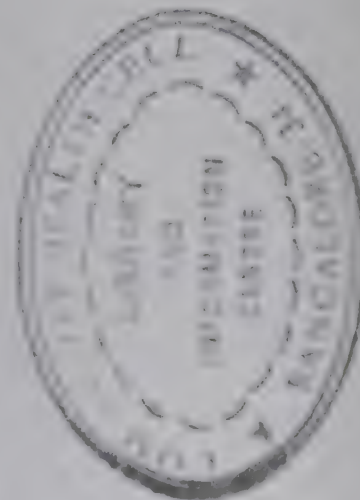
It is the responsibility of the treating physician and the respective diagnostic laboratories to work in close collaboration to ensure quality of diagnostic and staging procedures, to facilitate prompt referral of patients to treatment or palliative care, as well as to communicate and discuss about difficult cases. Regarding histopathological evaluation it is important to ensure that the specimen is adequately obtained, fixed, labeled and transported. As explained above, telemedicine may play an important role in providing distant and timely consultation within services or across services.

> For more information on cancer staging, go to
> http://www.cancer.gov/cancertopics/factsheet/detection/staging
> For information on the TNM classification system for cancer staging, go to
> http://www.uicc.org/index.php?option=com_content&task=view&id=14275&Itemid=197
>
> ⓘ
> WWW

TREATMENT SERVICES

Treatment services within the context of a national cancer control plan aim to cure the disease or prolong life considerably, while ensuring a good quality of life.

Cancer treatment is highly specialized and requires the involvement of various disciplines. The main treatments used alone or in combination are surgery, radiotherapy and chemotherapy. These can be carried out only where there are adequate diagnostic and therapeutic facilities, staffed by trained medical professionals.

Cancer patients and their families need person-centred care. When cancer strikes, it has more than a physical impact. Cancer (and its treatment) also has emotional, social, psychological and spiritual consequences for both the patient and their family members. Whether or not individuals have timely access to adequate *psychosocial support and rehabilitation*, when needed, will greatly influence their quality of life and their ability to cope.

Multidisciplinary teams of health-care professionals at the tertiary and secondary levels of care should evaluate the patient early in the treatment process, and guide subsequent treatment and follow-up. The team members are responsible for implementing clinical management protocols in accordance with national guidelines. All relevant health-care professions should be represented in the team, including radiation oncologists, surgeons, medical oncologists, paediatric oncologists, gynaecologists, pathologists, haematologists, radiologists and oncology nurses, as well as psychosocial and rehabilitation staff.

The decision as to which of the targeted cancers are treated at which of the levels of care will depend on the particular cancer, the stage at diagnosis, the type of treatment required and the availability of suitable infrastructure, as well as the availability of well-trained and experienced professionals (see Figure 1).

Surgery for common cancers, such as breast and cervical cancers, should be available at the secondary and tertiary health care levels. In contrast, surgery for less common and more complex diseases, such as cancer of the colon, stomach, oesophagus and larynx, should be done at regional or national reference centres where the appropriate expertise is more likely to be located.

In some settings, less complex surgery could be performed at district hospitals by well-trained professionals. Other simple procedures, such as cryotherapy for the treatment of pre-cancerous lesions of the cervix, can be done at the primary health care level by well-trained professionals (WHO, 2006). This presupposes that an early detection programme is in place in an area where there is a high incidence of cervical cancer.

Cancer surgery is a highly specialized and complex discipline and cancer surgeons need lengthy training. The surgeon who treats cancer must be familiar with the natural history of individual cancers and with the principles and potential roles of surgery, radiation therapy, chemotherapy, immunotherapy and other new treatment modalities.

It is important to recognize that surgical competence alone, without the back up of suitable infrastructure and a highly-qualified and competent supporting team, does not guarantee excellent results. In this context, it is interesting to note that anaesthesia-related mortality has decreased in the past four decades largely because of the development of new techniques and new anaesthetics, stricter practice standards, better infrastructure, and improved intra-operative monitoring techniques.

> The WHO manual *Surgical care at the district hospital*, which provides guidance on the organization and management of district surgical services, can be accessed via the WHO web site, go to
> http://www.who.int/surgery/publications/scdh_manual/en/index.html
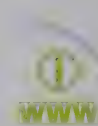
Radiotherapy requires costly equipment and facilities, and specialized expertise. Radiotherapy should, therefore, only be provided by regional or national cancer centres or tertiary level hospitals where the necessary infrastructure and expertise is concentrated and can be made available on a sustainable basis.

A radiotherapy unit needs highly specialized professionals and support staff, such as radiation oncologists, radiation therapy technologists, medical radiation physicists, physical therapists, psychologists, electronics technicians and maintenance engineers.

Before initiating construction of a radiotherapy facility, approval by the national regulatory authority must be obtained. The International Atomic Energy Agency (IAEA) requires the

presence of a national regulatory body, as well as a legislative and statutory framework to regulate the safety of facilities and radiation-related activities (IAEA, 1996). Although the initial capital outlay is significant, both in terms of equipment costs and staffing requirements, the running costs of radiotherapy services are relatively low.

A patient requiring radiotherapy may be treated using two broad groups of techniques: teletherapy and brachytherapy. External beam radiation therapy or *teletherapy* is usually administered in a tertiary hospital on an ambulatory basis. The treatment takes place in an enclosed shielded room (bunker) and no anaesthesia is needed for adult patients. It may be administered by cobalt machines or by medical linear accelerators. For the majority of patients with curable cancers or cancers that are treatable but not curable, cobalt machines are the more cost-effective option in low- and middle-income countries (WHO, 2002; Barton et al. 2006). This is not simply because the capital and maintenance costs of a cobalt machine are much lower than those for a linear accelerator, but also because a linear accelerator is easily damaged by an unstable electric supply, a common hazard in low-income countries (Van der Giessen, 2002).

For certain cancers, *brachytherapy* is usually administered in addition to teletherapy. For example, invasive cervical cancer requires intracavitary brachytherapy if the intent is to cure the disease. Brachytherapy may be administered in high dose rate or low dose rate depending upon the availability of expertise and infrastructure (WHO, 2006).

In addition to the teletherapy and brachytherapy equipment, high-quality treatment by radiotherapy requires certain quality assurance devices and tools, such as an imaging device (a fluoroscopic or computerized tomography simulator), immobilization devices, shielding devices, a treatment planning computer system and dosimetry tools.

The Programme of Action for Cancer Therapy (PACT) was created by the International Atomic Energy Agency (IAEA) in 2004 to help fight the developing world's growing cancer crisis. Building on the IAEA's expertise in radiotherapy, PACT is uniquely placed to promote the transfer of technology, experience and skills to those most in need. It aims to build partnerships with other cancer organizations to fight the disease on a broad, comprehensive and multidisciplinary front.

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For further information, go to
http://www-naweb.iaea.org/pact/whatwedo.asp

Chemotherapy is usually very expensive, may have severe side-effects and often requires patients to undergo a prolonged period of treatment. In low-resource settings, the initial focus for services should be the treatment of the most common curable cancers for which there is significant evidence that chemotherapy alone or in combination with other treatment modalities is effective.

A chemotherapy unit needs highly specialized professionals and support staff, such as medical oncologists, paediatric oncologists, haematologists, oncology nurses, pharmacists and psychologists. As most chemotherapy can be given on an outpatient basis, large-scale inpatient facilities are not required.

It is generally recommended that chemotherapy units be attached to district or general hospitals at the secondary level. This makes chemotherapy more accessible to patients and reduces the likelihood of abandonment of treatment. For example, the paediatric cancer programme in Honduras has recently established six satellite chemotherapy units in different provinces. These units provide ambulatory treatment, in accordance with national protocols, to patients diagnosed at the tertiary level referral centre. The units also provide follow-up of all the paediatric cancer patients in their respective geographical areas. They coordinate closely with the referral centre for training, monitoring, evaluation and research purposes.

More complex chemotherapy should be provided at the tertiary level in oncology departments, or in regional or national cancer centres, where the best diagnosis and treatment facilities and expertise are concentrated.

Having established national treatment protocols for the prioritized cancers, the necessary chemotherapeutic agents and other important medicines should be included in a country's list of essential medicines. The essential drugs list and the treatment protocols will guide the practice of chemotherapy nationwide, in both private and public institutions.

WHO's model list of essential medicines (WHO, 2007), which includes a range of chemotherapy drugs on which countries can base their own essential medicine lists, is updated every 2 years.

> The current WHO model list of essential medicines can be obtained from the WHO web site, go to
> http://www.who.int/medicines/publications/EssMedList15.pdf www

Access to essential drugs has improved in most low-income countries with the production of generic versions of proprietary drugs. Generic drugs are frequently as effective as, but much cheaper than, brand-name drugs and are available locally.

Psychosocial support should be an integral part of treatment services. Cancer programmes need to ensure that psychosocial support is available in addition to surgical, chemotherapy and hormone therapy, radiation and symptom management interventions. This requires collaborative partnerships among a range of institutionally-based and community-based health-care providers, as well as the involvement of professional and volunteer bodies.

Basic psychosocial care must be integral to the practice of all health-care professionals dealing with cancer patients. Psychosocial care is demonstrated in actions such as:

- offering patients and their families emotional support and information;
- communicating in a person-centred and sensitive manner;
- referring patients to peer support (such as other cancer patients or cancer survivor groups) and volunteer-led initiatives that help patients meet their psychosocial needs;
- referring patients requiring additional assistance to psychosocial experts, such as social workers, psychologists, chaplains, trained nurses and therapists.

Individuals who receive appropriate emotional or psychosocial care during the period of diagnosis and treatment tend to experience less anxiety and depression, and are more likely to be able to return to a productive life. Both patients and families report a significant improvement in quality of life (Blake-Mortimer et al., 1999; Coates, 1997), and better adherence to therapy has been observed (Fawzy, 1999).

IMPLEMENT QUALITY CONTROL

For a diagnosis and treatment programme to be effective, it needs competent management and a quality control system that ensures that services are provided in accordance with quality standards.

Key elements in a quality control system for a diagnosis and treatment programme are:

- continuous training of health-care providers at the different levels of care;
- monitoring of management processes and results;
- provision of clinical services by competent health professionals, in accordance with established clinical guidelines;
- maintaining the required quality and safety standards for laboratory and treatment equipment, infrastructure and materials (including drugs).

In the case of chemotherapy, the quality control system should ensure that drugs are:

- obtained from reliable manufacturers;
- stored, used and discarded according to prescribed conditions;
- periodically analysed for bioactivity in a national laboratory;
- prescribed only by adequately trained physicians.

In the case of radiation therapy, the quality control system should ensure that:

- processes and procedures are designed to confirm that radiotherapy is administered appropriately and safely, and documented properly;
- a hospital radiation safety committee is established for the prevention of radiation accidents, as well as to ensure adherence to optimal medical practice and compliance with the International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources (IAEA,1996).

ESTABLISH REGISTRATION AND COORDINATION SYSTEMS

Hospital-based cancer registries and coordination systems are important tools for ensuring adequate follow-up of all cancer patients in a given target group. They are also important for quality control, and monitoring and evaluation purposes (Jensen et al., 1991).

Useful tools for developing hospital-based cancer registries can be accessed through the web site of the United States Centers for Disease Control and Prevention, go to http://www.cdc.gov/cancer/npcr/tools/registryplus/ap.htm

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BUILD IN MONITORING AND EVALUATION

Both the development and the implementation of a cancer diagnosis and treatment programme need to be monitored and evaluated periodically in order to ensure that the objectives of the programme are being achieved. Evaluation requires careful design and planning. This should start early on in the planning phase of the activities.

Mention has already been made of the application of a quality improvement framework to the evaluation of the performance of diagnosis and treatment programmes (see planning step 2). Table 8 provides examples of structure, process and outcome indicators and their standards, which can be used to evaluate a diagnosis and treatment programme targeting common curable cancers. *National cancer control programmes: policies and managerial guidelines* (WHO, 2002) provides further guidance on monitoring and evaluating cancer control programmes, including diagnosis and treatment programmes, using both the quality improvement and the system model frameworks.

No matter which framework is used, the evaluation plan needs to define clearly:

- who will do the evaluation;
- what will be evaluated;
- which core indicators (measures) and standards (values set by stakeholders) will be used;
- how the evaluation will be designed and carried out to ensure credibility;
- how the results of the evaluation will be used to improve programme performance.

Table 8. Examples of structure, process and outcome indicators and their standards for the evaluation of a diagnosis and treatment programme for common curable cancers

| Core indicators	Standards
STRUCTURE	
○ Policies and regulations include diagnosis and treatment as a key component of the national cancer control plan	Official documents, laws, regulations, guidelines or manuals published, updated and available
○ Funding and service delivery models established to support the provision of cancer diagnosis and treatment for all patients with curable cancers	
○ List of essential medicines for the complete treatment of curable cancers requiring chemotherapy agents and other medicines	
○ Network of health workers across the different levels of care trained to refer patients without delay or to provide good diagnostic and treatment services	Accreditation of referral, diagnosis and treatment services at the respective levels of care
○ Hospital registries for monitoring and follow-up of all cancer patients targeted by the programme, linked to the early detection information system as needed	Computerized standardized hospital registries for targeted cancers
○ Educational courses that provide: – core knowledge and skills to practising health-care professionals across all levels of care regarding referral of cancer cases and provision of palliative care; – expert knowledge and skills to selected health-care professionals on providing diagnosis and treatment services at the secondary and tertiary levels, as needed – undergraduate oncology education to health-care professionals (doctors, nurses, pharmacists, social workers) focusing on awareness of early signs and symptoms of common detectable cancers – education to patients and family caregivers	Undergraduate and postgraduate courses available, including in-service training for health workers across all levels of care Education of patients and family members integrated into clinical services Patient support groups available
PROCESS	
○ Number of cases detected early where patients get timely confirmation of diagnosis	Within a month of referral date
○ Number of curable cancer patients getting timely treatment	Within a month of diagnosis
○ Number and type of trained health-care professionals at the secondary and tertiary levels of care qualified to provide diagnosis and treatment for curable cancers according to established standards	To be defined according to the patients load and countries capacity
○ Proportion of patients whose cancers are detected early who get timely diagnosis	>80% diagnosed within a month
○ Proportion of patients with diagnosed curable cancers who get timely treatment	>80% initiated treatment within a month
○ Proportion of curable cancer patients who get adequate treatment according to established guidelines	>80%
○ Proportion of curable cancer patients who abandon or do not complete treatment, by age, sex and socioeconomic group	<10%
○ Proportion of curable cancer patients and their family caregivers who get psychosocial support throughout the course of the disease	>80%
○ Proportion of patients and family caregivers receiving relevant education	>80%
OUTCOME	
Short-term outcomes	
○ Proportion of curable cancer cases diagnosed in early stages	>70%
Medium- and long-term outcomes (5 and 10 years)	
○ Overall 5-year survival rates for curable cancers	>80%
○ Overall 10-year survival rates for curable cancers	>60%
○ Mortality rates for curable cancers	<20%

CONCLUSION

A plan for the diagnosis and treatment of cancer is a key component of any overall cancer control plan. Its main goal is to cure cancer patients or prolong their life considerably, ensuring a good quality of life. In order for a diagnosis and treatment programme to be effective, it must never be developed in isolation. It needs to be linked to an early detection programme so that cases are detected at an early stage, when treatment is more effective and there is a greater chance of cure. It also needs to be integrated with a palliative care programme, so that patients with advanced cancers, who can no longer benefit from treatment, will get adequate relief from their physical, psychosocial and spiritual suffering. Furthermore, programmes should include a awareness-raising component, to educate patients, family and community members about the cancer risk factors and the need for taking preventive measures to avoid developing cancer.

Where resources are limited, diagnosis and treatment services should initially target all patients presenting with curable cancers, such as breast, cervical and oral cancers that can be detected early. They could also include childhood acute lymphatic leukaemia, which has a high potential for cure although it cannot be detected early. Above all, services need to be provided in an equitable and sustainable manner. As and when more resources become available, the programme can be extended to include other curable cancers as well as cancers for which treatment can prolong survival considerably.

This module on diagnosis and treatment is intended to evolve in response to national needs and experience. WHO welcomes input from countries wishing to share their successes in diagnosis and treatment. WHO also welcomes requests from countries for information relevant to their specific needs. Evidence on the barriers to diagnosis and treatment in country contexts – and the lessons learned in overcoming them – would be especially welcome (contact at http://www.who.int/cancer).
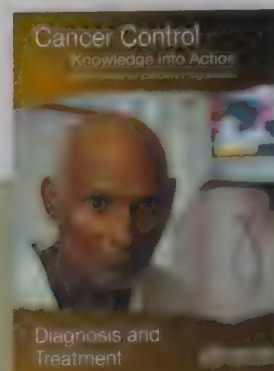
REFERENCES

- Barr R et al. (2002). Pediatric oncology in countries with limited resources. In: Pizzo PA, Poplack DG, eds. *Principles and practice of pediatric oncology*. Philadelphia, Lippincott, Williams and Wilkins:1541–1552.

- Barton M et al. (2006). Role of radiotherapy in cancer control in low-income and middle-income countries. *Lancet Oncology*, 7:584–595.

- Bonilla M, Ribeiro R, Wilimas J (2006). Pediatric oncology in developing countries. In: Sierrasesumaga L, Antillon F, eds. *Monograph on pediatric oncology*. Madrid, Pearson Prentice Hall: 881–893.

- Blake-Mortimer J et al. (1999). Improving the quality and quantity of life among patients with cancer: a review of the effectiveness of group psychotherapy. *European Journal of Cancer*, 35:1581–1586.

- Coates A (1997). Quality of life and supportive care. *Supportive Care in Cancer*, 5:435–438.

- Desai S, Patil R, Kothari A et al. (2004). Telepathology consultation service between Tata Memorial Centre, Mumbai and Nargis Dutt Memorial Charitable Hospital, Barshi, Solapur, Maharashtra: an analysis of the first 100 cases. *Indian Journal of Pathology and Microbiology*, 50:749-753.

- Fawzy FI (1999). Psychosocial interventions for patients with cancer: what works and what doesn't. *European Journal of Cancer*, 35:1559–1564.

- IAEA (1996). *International basic safety standards for protection against ionizing radiation and for the safety of radiation sources*. Vienna, International Atomic Energy Agency (Safety Series, No.115).

- Jensen OM et al., eds. (1991). *Cancer registration: principles and methods*. Lyon, International Agency for Research on Cancer Press (IARC Scientific Publication, No. 95).

- Longo DL (2005). Approach to the patient with cancer. In: Kasper DL et al, eds. *Harrison's Principles of Internal Medicine*, 16th ed. New York, McGraw Hill Medical Publishing Division: 435–441.

- National Cancer Institute (2003). *Common terminology criteria for adverse events*, Version 3.0. Bethesda, MD,United States, Department of Health and Human Services, National Institute of Health (http://ctep.cancer.gov/forms/CTCAEv3.pdf, accessed 18 October, 2007).

- Sausville EA, Longo DL (2005). Principles of cancer treatment. In: Kasper DL et al, eds. *Harrison's Principles of Internal Medicine*, 16th ed. New York, McGraw-Hill Medical Publishing Division: 464–482.

- Van der Giessen P (2002). Maintenance costs for cobalt machines and linear accelerators: new machines versus old. *Radiotherapy and Oncology*, 62:349–350.

- WHO (2002). *National cancer control programmes: policies and managerial guidelines*, 2nd ed. Geneva, World Health Organization.

- WHO (2005). *World Alliance for Patient Safety: WHO draft guidelines for adverse event reporting and learning systems: from information to action*. Geneva, World Health Organization.

- WHO (2006). *Comprehensive cervical cancer: a guide to essential practice*. Geneva, World Health Organization.

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Other participants

Barry D. Bultz, Tom Baker Cancer Centre and University of Calgary, Canada

Jon F. Kerner, National Cancer Institute, USA

Luiz Antônio Santini Rodrigues da Silva, National Cancer Institute, Brazil

Observers

Benjamin Anderson, Breast Health Center, University of Washington School of Medicine, USA

Maria Stella de Sabata, International Union Against Cancer, Switzerland

Joe Harford, National Cancer Institute, USA

Jo Kennelly, National Cancer Institute of Canada, Canada

Luiz Figueiredo Mathias, National Cancer Institute, Brazil

Les Mery, Public Health Agency of Canada, Canada

Kavita Sarwal, Canadian Strategy for Cancer Control, Canada

Nina Solberg, Norwegian Cancer Society, Norway

Cynthia Vinson, National Cancer Institute, USA

The World Health Organization estimates that 7.6 million people died of cancer in 2005 and 84 million people will die in the next 10 years if action is not taken.

More than 70% of all cancer deaths occur in low and middle income countries, where resources available for prevention, diagnosis and treatment of cancer are limited or nonexistent.

Yet cancer is to a large extent avoidable. Over 40% of all cancers can be prevented. Some of the most common cancers are curable if detected early and treated. Even with late cancer, the suffering of patients can be relieved with good palliative care.

Cancer control: knowledge into action: WHO guide for effective programmes is a series of six modules offering guidance on all important aspects of effective cancer control planning and implementation.

Worldwide, millions of cancer patients can be cured or have their lives prolonged considerably if they have timely access to adequate diagnosis and treatment services.

This module addresses specific aspects of diagnosis and treatment. It is based on the *Planning* module, which provides a comprehensive understanding of the overall cancer control planning process and its main steps. The *Diagnosis and treatment* module discusses how to develop an effective diagnosis and treatment programme with a public health approach, within the context of a national cancer control programme.